A Brief History of the Development of the Natural Sciences, University of Notre Dame

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The Academic Organization varies in different Universities (1). That which exists at Notre Dame University is composed of five undergraduate colleges, a Graduate School, and two Institutes.

The undergraduate colleges are: the College of Arts and Letters founded in 1842, the College of Science established in 1865, the College of Law was inaugurated in 1869, and the College of Engineering was founded in 1873. These units were called divisions previous to 1905, at which time they were designated as colleges. The College of Commerce was added in 1920 (2).

The Graduate School was instituted in 1918. Before that year, graduate courses were not a regular part of the curriculum of the University. The few students who pursued studies for advanced degrees did so by special arrangement and under the direction of specially assigned members of the college faculties. With the establishment of the summer session in 1918, however, the number of candidates for higher degrees increased and more definite provision for graduate work was entrusted to a committee of twelve members of the general faculty (later reduced to seven), called the Committee on Graduate Study. In 1944 this Committee was replaced by a Dean and Graduate Council (3). Rev. Philip S. Moore, C.S.C., who had been most instrumental in encouraging graduate work, was the first Dean. He held this position until 1952 when he became Vice-President in charge of Academic Affairs. Father Moore was succeeded by the present Dean, Rev. Paul E. Beichner, C.S.C. At the present time work leading to the Master's degree is offered in nineteen departments, and for the Ph.D. degree in twelve departments of the University. In 1930, 48 students were enrolled in the Graduate School and by 1954 the enrollment had increased to 391.

The Mediaeval Institute is a foundation established in 1947 by Rev. Hugh O'Donnell, C.S.C., President of the University, for the study of the thought, history and culture of the Middle Ages. The first Director, Rev. Geral D. Phelan, ably directed the Institute until he returned to his native Canada in 1952. Father Phelan was succeeded by the present Director, Canon A. L. Gabriel.

The Lobund Institute (Laboratories of Bacteriology of the University of Notre Dame) had its beginning in 1930 (4), when members of the Biology Department, under the inspiration and leadership of J. Arthur Reyniers, began the investigation of the biology of microorganisms and micrurgy. In 1937, Professor Reyniers was made Director of the Laboratories, and in 1952 this work was officially established as a separate Institute within the University.

Before the College of Science was established the various scientific subjects were taught as part of the program in Arts and Letters. In 1844, Brother Augustine, C.S.C. was appointed to teach botany and zoology. Thomas McKinnis was listed as professor of chemistry in 1852 (5). J. E.

Tallon, M. D. (6) in 1859 joined the faculty as professor of physiology, anatomy and botany. In 1863, Rev. Louis Neyran was made professor of anatomy, physiology and hygiene, but served as Chaplain in various hospitals during the Civil War and did not begin to teach until 1866. In 1863, Rev. Thomas L. Vagnier, C.S.C. was also appointed professor of botany, as well as of chemistry and physics (7).

By 1864 the success of the scientific subjects warranted a separate organization, and in that year, under the presidency of Rev. Patrick Dillon, C.S.C., the College of Science was organized as a separate unit. From this inception there was a gradual organization of departmental administration, but no official separation into departments was made until 1920.

Rev. T. L. Vagnier, C.S.C., Professor of botany, chemistry and physics, was appointed the first director of the College in 1865 and continued in this capacity until 1868. He was succeeded by Rev. C. B. Carrier, C.S.C., Professor of botany, who, aided by Rev. John A. Zahm, C.S.C., distinguished natural scientist and Dante scholar, as his assistant, ably held the position until 1874. During these years the science courses made excellent progress through the efforts of these men and those of four or five other competent professors. It was during this period that a "partial medical course" was introduced by Father Neyron.

In 1874 Father Carrier was transferred to Texas and for the next forty-four years (1874-1918) Rev. Alexander M. Kirsch, C.S.C., successful anatomist, cytologist and bacteriologist, capably directed the study of the natural sciences at Notre Dame. On April 23, 1879 (8), five years after Father Kirsch became Director of the College of Science, Notre Dame suffered a serious fire which destroyed all the buildings except the Church and the Auditorium. This loss included the library, the museum and the herbarium which contained 4,000 to 5,000 specimens (9). Father Kirsch, like other members of the University, received inspiration and courage by the words of the sixty-five-year-old founder, Father Sorin, who, after viewing the ruins of much of the labor of thirty-seven years, finished his talk to them with these words, "If it were *all* gone, I should not give up" (10).

During Father Kirsch's directorship work in various fields of the physical and biological sciences rapidly developed. Science Hall was built in 1883 to house the developing departments of biology, chemistry, mathematics and physics, and to afford space for the rapidly growing University Museum. By 1893 it was recognized that Science Hall was inadequate and a separate building for chemistry was constructed. This building was severely damaged by fire in 1916 and plans for a new and much larger Chemistry Hall were immediately started and the new building was occupied in 1918.

In 1875 Rev. John A. Zahm, C.S.C. succeeded Rev. Thomas L. Vagnier, C.S.C. as professor of physics and chemistry, and in 1891 Rev. James A. Burns, C.S.C. became professor of chemistry. Rev. Joseph McGuire, C.S.C. was added to the chemistry staff in 1898. In 1904, Rev. Julius A. Nieuwland, C.S.C. began his work at Notre Dame in botany and chemistry, in which fields he was to gain renown. He founded in 1909, at the sugges-

tion of Dr. Edward Lee Greene, *The American Midland Naturalist*, and edited the progressive journal until 1935, when he requested Dr. Theodor Just to assume the editorship. Under Just's capable editorship the journal increased in national and international recognition. In 1944 he introduced the supplementary series, known as the American Midland Naturalist Monograph Series. Dr. John D. Mizelle, as editor, further enhanced the reputation of the journal and the Monograph Series from 1947 to the fall of 1954, when the present editor, Dr. Arthur L. Schipper, succeeded him.

Previous to 1879, the University Herbarium contained about 4,000 to 5,000 European, New Zealand and American plants. These were destroyed by the fire of 1879 (11). Collections were again started and during the succeeding years contributions were made by Fathers Joseph Carrier, C.S.C., Alexander Kirsch, C.S.C., Julius A. Nieuwland, C.S.C., and Peter Hebert, C.S.C., and by Doctors Theodor Just and Albert Delisle. At the present time this herbarium, called the "Julius A. Nieuwland Herbarium," contains about 250,000 specimens, chiefly American plants, many of which have been received by exchange, purchase or gift. Father Nieuwland's own collection is the largest individual contribution. Dr. Edward L. Greene, botanical authority, gave to the University in 1914 his treasured botanical library of about 4,000 volumes and his irreplaceable herbarium of about 100,000 specimens, including the majority of types of the numerous new species of American plants described by him. This collection is kept as a separate "Edward Lee Greene Herbarium."

As previously mentioned, Father Neyron in 1870 introduced a "partial medical course," and a medical department was recognized (12). Interest in the study of medical subjects continued and "As early as 1885 medicine was an optional study during the Post-graduate Course" (13). By 1907 students were allowed to attend surgical clinics in St. Joseph's Hospital in South Bend. In the course of these years local physicians of South Bend taught most of the medical subjects. However, the University did not award Doctor of Medicine degrees and by 1918 most of the medical classes had been discontinued, however, a few were retained in the program for the bachelor's degree.

At the age of 63 Father Kirsch resigned as Director of the College of Science, and Rev. Julius A. Nieuwland, C.S.C. succeeded him and held the position from 1918 until 1923. In 1920, the Colleges of the University were reorganized and given their present instructional and administrative forms by the President, Rev. James A. Burns, C.S.C. Previous to this time the chief administrative officer of each college was called the Director; he now assumed the title of Dean. Up to this time there were no separate departments in the College of Science, although the equivalent organization was functioning in biology and chemistry (14). In 1920, the college of Science was organized into separate departments of biology, chemistry, physics, mathematics, astronomy, and pharmacy. The two last departments were discontinued by 1939, and a Department of Geology was established in 1948.

To permit him to devote all of his time to teaching and research, principally in chemistry, Father Nieuwland was relieved of his admin-

istrative duties in 1923. For years he had been doing research in acetylene chemistry, and in 1927 gained international recognition for his discovery of mono-vinyl acetylene which turned out to be the basis of a synthetic rubber. He was succeeded as Dean by Rev. Francis J. Wenninger, C.S.C., zoologist and Head of the Department of Biology, who held this position from 1923 until 1927, when Rev. George W. Albertson, C.S.C., bacteriologist and botanist, became Acting Dean while Father Wenninger was on leave of absence for studies in Europe. Father Albertson died in 1929 and Father Wenninger returned to Notre Dame and continued as Dean until his death in 1940.

Under Father Wenninger's able leadership significant progress was made in all of the departments in his College. The task was considerable for the enrollment of the University increased from 1,207 in 1920 to 3,343 in 1940 (15). More faculty, buildings and equipment were needed and rapid advances were being made in research in the Departments of Biology (Bacteriology), Chemistry (Organic Chemistry) and Physics (Nuclear Physics). The Science Hall, which housed the Departments of Biology, Mathematics and Physics, as well as the University Museum, was considerably enlarged in 1924; yet this did not suffice and a separate Biology Building was erected in 1937.

Dr. Henry Froning, Professor of Chemistry, was chosen as Father Wenninger's successor and acted in this capacity until his retirement in 1943. He was succeeded by the present dean, Dr. Lawrence H. Baldinger, Professor of Chemistry.

During the war, Navy and Marine trainees used the University facilities and much of the graduate and research work was curtailed due to heavy teaching schedules of the faculty, as the enrollment had been increased by the Armed Services to about 5,000, and it was necessary to teach three in place of two semesters each year. After the war, the University decided to retain this number of students as a quota. Consequently, more buildings were needed, more faculty and equipment were required so that the graduate and research program could again continue and be augmented.

This expansion has necessitated the erection of new buildings for the College of Science. A greenhouse near the Biology Building was erected in 1951. In 1952, three additional buildings: a large-production germ-free laboratory, an animal house, and a machine shop were completed for the expanding needs of Lobund. The Nieuwland Science Center, named in recognition of Father Nieuwland's work, was dedicated in 1953, and houses the Chemistry, Physics and Mathematics Departments, although the Chemistry Department still needs the use of the older Chemistry Hall.

Since the Nieuwland Science Center provided ample room for the Mathematics and Physics Departments, the old Science Hall was converted into a Student Center in 1953. This entailed the discontinuance of the Museum as a display collection. These collections were started as early as 1845, with the present of Dr. Cavalli of Detroit, Michigan. Previous to its destruction in the fire of 1879 this collection was considered "Apparently one of the better collections of its kind at the time" (9). With the gift of a collection of minerals and fossils by Rev. D. Clarke of Columbus,

Ohio in 1880, efforts were renewed to rebuild the Museum. Fathers Zahm, Kirsch and Wenninger collected and received other valuable additions until 1940. In 1953 most of the botanical and zoological specimens were transferred to the Biology Building for teaching and research needs and the minerals were deposited with the Geology Department for the same purposes.

The collection of books for the University needs was begun by the Rev. August Lemonnier, C.S.C., fourth president of the University (1872-1874). In 1879 the library, which had grown to 10,000 volumes, was almost completely destroyed in the disastrous fire of that year (16). The present General Library Building was built in 1917 and now houses 274,404 volumes for the Colleges of Arts and Letters, and Commerce. Separate Colleges of Law and Engineering libraries are housed in their respective buildings. The College of Science libraries are in two buildings. Previous to 1893, the science collections were located in the Science Hall. When the first Chemistry Hall was built in that year, the chemistry collections were moved to these new quarters. In succeeding years the biology libraries were moved to the present Biology Building (1937) and the chemistry, mathematics and physics collections to the Nieuwland Science Center (1953).

The biology libraries, housed in separate rooms, consist of: The "Edward Lee Greene Botanical Library" of 2,900 volumes; the "Julius A. Nieuwland Botanical Library" of nearly 10,000 volumes, and the "Wenninger-Kirsch Zoological Library" of approximately 11,000 volumes (17). The physical sciences and mathematic libraries are housed together and contain over 18,000 volumes (18).

While the University has from the beginning been conducted by the Congregation of Holy Cross, with a large number of priests and brothers serving the faculty, there has always been a considerable number of lay professors. As a result of the rapid expansion the number of lay faculty members has increased. The faculty in the school year for 1953-54 numbered 564; 88 priests and brothers, 335 full-time lay faculty members, and 141 teaching fellows. In the College of Science there were 14 priests and brothers, 50 full-time lay faculty members, and 60 teaching fellows. In 1943, when Dean Baldinger assumed his duties as Dean, there were enrolled 295 undergraduate science majors and this number had increased to 663 in 1954. In concluding this sketch of the history of the development of the natural sciences at Notre Dame, therefore, it should be pointed out that all five of the departments offer undergraduate degree programs and that facilities for advanced training and research leading to the master's and doctor's degrees are available in the Biology, Chemistry, Mathematics and Physics Departments. Of the 383 graduate students enrolled in 1954, 135 were majors in the departments of the College of Science.

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